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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/905,450

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Yoshiaki Iwai

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03/16/2004

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EXAMINER

NATNAEL, PAULO S M

ART UNIT

PAPER NUMBER

2614

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/905,450

Applicant(s)

IWAI ET AL.

Examiner

Paulos M. Natnael

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2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-12 is/are allowed.
- 6) ☒ Claim(s) 1, 3 and 5 is/are rejected.
- 7) ☒ Claim(s) 2 and 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figures **7-9** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 4 is objected to because of the following informalities: the claimed "sixth part, should follow the fifth part in claim 2, however, claim 4 depends from claim 3 which in turn depends from claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims **3** and **5** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim **3**, the claimed "the plane position parameters" and "the projection matrixes" lack antecedent basis. Claim 3 depends from claim 1, which does not recite

the claimed phrases. Claim 2 recites both position parameters and projective transformation matrixes, therefore, claim 3 should be dependent on claim 2 instead.

In claim 5, the claimed "the distortion parameters" and "the projective transformation matrixes" also lack antecedent basis. Claim 5 depends from claim 1 which does not recite the claimed phrases. Claim 2 recites both "distortion parameters" and "projective transformation matrixes", therefore, claim 5 should depend from claim 2 instead.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsugu et al., U.S. Pat. No. 6,621,921.

Considering claim 1, Matsuga et al discloses all claimed subject matter, note;

a) an image holding device for holding images obtained by shooting a plane, where a known pattern is drawn, ... at at least three view points free from any spatial positional restriction, is met by image storage section 11, Fig.1B, which holds or stores image data

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taken by the two cameras 6 at arbitrary viewpoints. (see Abstract, col. 8, lines 40-47, and Fig.8)

b) a parameter calculating device for calculating parameters necessary for distance measurement in the stereo system based on the images held by the image holding part, is met by the main controller 10 (fig.1B) and/or Image processing means 4 (fig.1A), which may be built in the image pick-up means 1 (see col. 5, lines 62-64), which controls the image-pickup parameter estimation, distance measurement and calculation. (See Fig.8; col. 8, lines 7-10, 28-39; col. 9, lines 23-30, 37-43, and 59-62)

Except for;

c) the claimed with "base" camera and "detection" camera;

Regarding c), Matsugu et al. discloses two cameras taking images of the plane 2 from two different positions or angles. Matsugu et al however does not specifically disclose which one is the base and which is the detection camera. Nevertheless, it would have been obvious to the skilled in the art at the time the invention was made to modify the system Matsugu et al. by choosing one or the other cameras 6 as a base camera and designate the other as a detection camera, so that the images taken are distinguishable from one another or are easily known to the operator.

Allowable Subject Matter

7. Claims **6-12** are allowable over the prior art.

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8. Claims **2,4** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims **3 and 5** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to disclose a camera calibration technique wherein a parameter calculating device comprises: a first part for presuming distortion parameters of the base camera and the detection camera by the use of the shot images; a second part for calculating projective transformation matrixes to project the shot images respectively onto predetermined virtual planes; a third part for calculating internal parameters of the base camera on the basis of the projective transformation matrixes obtained by the second part with regard to the images from the base camera; a fourth part for presuming the position of the shot plane based on both the internal parameters of the base camera calculated by the third part and the images obtained from the base camera; and a fifth part for calculating projection matrixes for the detection camera based on both parameters of the plane position presumed by the fourth part and the images obtained from the detection camera, as in claim 2; a camera calibration method for calibrating a stereo system, which includes a base camera and a detection camera, by using images obtained by shooting a plane, where a known pattern is drawn, with

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the individual cameras at at least three view points free from any spatial positional restriction, the method comprising the steps of: presuming distortion parameters of the base camera and the detection camera by using the images thus obtained; calculating projective transformation matrixes to project the images respectively onto predetermined virtual planes; calculating internal parameters of the base camera based on the projective transformation matrixes obtained during the step of calculating projective transformation matrixes with regard to the images from the base camera; presuming the position of the shot plane based on both the internal parameters of the base camera calculated at the step of calculating internal parameters and the images obtained from the base camera; and calculating projection matrixes for the detection camera based on both parameters of the plane position presumed at the step of presuming and the images obtained from the detection camera, as in claims **6** and **10**.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fridge, U.S. Patent No. **5,638,461** discloses a stereoscopic electro-optical system for automated inspection and/or alignment of imaging devices on a product assembly line.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Paulos M. Natnael* whose telephone number is (703) 305-0019. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *John Miller* can be reached on (703) 305-4795. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Paulos Natnael
March 8, 2004


PAULOS M. NATNAEL
PATENT EXAMINER